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ABSTRACT

This study uses a representative sample of 3050 twelfth grade students from 18 schools to examine the ways in which the socioeconomic composition of a school is related to its students' educational plans. The basic premise investigated is that students attending schools with a greater proportion of high socioeconomic status (SES) students are more likely to go to college than those attending schools with a large proportion of low socioeconomic status students. Related theories and research studies are reviewed. A model is presented which focuses on three possible influences: (1) school climate; (2) peer relationship; and (3) placement in a college preparatory curriculum. This model is analyzed to distinguish "contextual" from "compositional" effects. Results indicate that the "contextual" impact of a school's average SES level on student educational plans is minor. (Author/EB)

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SCHOOL SES INFLUENCES--COMPOSITION OR CONTEXT

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Introductory Statement

The Center for Social Organization of Schools has two primary objectives: to develop a scientific knowledge of how schools affect their students, and to use this knowledge to develop better school practices and organization.

The Center works through four programs to achieve its objectives. The Studies in School Desegregation program applies the basic theories of social organization of schools to study the internal conditions of desegregated schools, the feasibility of alternative desegregation policies, and the interrelation of school desegregation with other equity issues such as housing and job desegregation. The School Organization program is currently concerned with authority-control structures, task structures, reward systems, and peer group processes in schools. It has produced a large-scale study of the effects of open schools, has developed Student Team Learning Instructional processes for teaching various subjects in elementary and secondary schools, and has produced a computerized system for schoolwide attendance monitoring. The School Process and Career Development program is studying transitions from high school to post secondary institutions and the role of schooling in the development of career plans and the actualization of labor market outcomes. The Studies in Delinquency and School Environments program is examining the interaction of school environments, school experiences, and individual characteristics in relation to in-school and later-life delinquency.

This report, prepared by the School Organization program, re-examines conventional theoretical and methodological understanding of how socioeconomic composition of schools is related to student educational plans.

ABSTRACT

After reviewing several lines of sociological theorizing and research on the ways in which the average student SES level in a school may influence the educational plans of individual students, we develop and specify a formal model of such influences incorporating three major themes from the extant literature. Using data on 3050 students from 18 high schools, appropriate technical analyses were performed on this model to distinguish the "contextual" effects of average SES level from the strictly "compositional" consequences of the distribution of SES levels across schools. Our results indicate that after compositional differences are taken into account, the "contextual" effects of average SES level are trivial. Hence, many of the questions concerning proposed mediating mechanisms of such influences become moot. Additional analyses demonstrate how some common methodological misunderstandings can lead to improper calculations and conclusions in studies of this general character.

SCHOOL SES INFLUENCES -- COMPOSITION OR CONTEXT?

I. Introduction

The importance of student body characteristics as educational resources is a prominent concern in much research on cognitive and non-cognitive outcomes of schooling. Reference group theory in particular has drawn attention to their relevance for the acquisition of values and goal-orientations within schools, and has viewed various attributes of students collectively as characterizing types of educational environments (Bidwell, 1972; Haller and Woelfel, 1972; Woelfel and Haller, 1971).

The substantial research literature now available indicates that this emphasis on the student body is well-founded. Twenty years ago, Wilson (1959) demonstrated that youth attending schools with a higher percentage enrollment of high status students were more likely to intend to go to college than would otherwise be expected of them on the basis of their own status origins and academic performance. That students attending such schools are in fact advantaged in this regard, as well as in other respects relevant to their educational prospects, has been confirmed in more recent research (Alexander and Eckland, 1975; Alwin and Otto, 1977; Bain and Anderson, 1974; Boyle, 1966; Hauser, Sewell and Alwin, 1976; Meyer, 1970; Nelson, 1972). Although the absolute importance of school-level SES for all educational outcomes invariably has been modest, the accumulated evidence for its relevance to school productivity processes is most impressive.

Why this is so, however, is neither self-evident nor well-understood.

The methodology used in research on correlates of school average SES level has been subject to some criticism (Hauser, 1970; 1971). Until quite recently, though, a more serious deficiency of this literature has been its failure consistently to identify and evaluate the mechanisms by which differences in average SES level among schools actually impact on student outcomes. Early research reports either omitted any conceptual discussion of their findings or else assumed that differences in average SES level between schools stood merely as proxies for school-to-school differences in normative climates or academic subcultures. There is, of course, no dearth of theorizing about the latter, but measuring them convincingly is quite another matter.

Fortunately, however, a program of research carried on by McDill and his colleagues has measured schools' normative environments directly. Their results (McDill, Meyers and Rigsby, 1967; McDill and Rigsby, 1973; McDill, Rigsby, and Meyers, 1969) indicate that academically oriented normative climates do somewhat enhance students' performance and college plans; further, when these aspects of the normative climate are controlled, average SES level of the school is virtually unrelated to such outcomes. This is consistent with the interpretation that school differences in student-body SES are important because they are associated with differences in value climate (sometimes characterized as "environmental press").

However, the "climate" explanation is not the only way to account for the seeming importance of school SES. A second approach emphasizes the implications of students' aggregated status levels for the quality and character of peer networks. Specifically, in schools with high average SES levels, rather than low, any individual student is more likely to establish friendships

with high SES classmates. Through well-documented processes of interpersonal and reference group influence (Duncan, Haller and Portes, 1968; Haller and Butterworth, 1960; Herriott, 1963; Kandel and Lesser, 1969; Kelly, 1952; Sewell, Haller and Ohlendorf, 1970; Simpson, 1962; Woelfel and Haller, 1971), the enhanced likelihood of entering into close relationships with high SES peers in schools of high average SES level is thought to yield numerous educational benefits. This framework, first pursued by Campbell and Alexander in school effects research (1965), and subsequently supported in a number of inquiries (Alexander and Eckland, 1975; Alwin and Otto, 1977; Hauser, Sewell and Alwin, 1976), thus posits the interpersonal mediation of school average SES effects through networks of informal association.

These two perspectives account for school SES influences in social-psychological terms, the first emphasizing common normative contexts and the second informal subgroup processes. Neither gives much consideration to structural features of school organization that might also be relevant, such as the school's pattern of curriculum enrollment.

In a provocative essay some years ago, James Conant (1961) argued that the school systems in high SES communities, in response to community preferences and pressures, should be especially oriented toward the college preparation and placement of their charges. In pursuit of this mission their administrative policies and use of prevailing educational technology should be directed toward the early identification of those students deemed suited for college and to the nurturing of their college prospects to the fullest extent possible. The primary administrative mechanism for effecting such selection and allocation at the secondary level is curriculum tracking (Parsons, 1959). Hence, college preparatory enrollment should be at a maximum in high

SES schools, and if such tracking is an effective device for achieving its intended objective, students so enrolled should realize several academic benefits, including enhanced academic aspirations.

Recent research on secondary school curriculum placement has very much borne out these expectations (Alexander, Cook and McDill, 1978; Alexander and McDill, 1976; Heyns, 1974; Hauser, Sewell and Alwin, 1976; Rosenbaum, 1975). One consequence of track placement especially relevant to our present concerns is the tendency for enrollment in a college preparatory curriculum to increase or crystallize students' intentions to attend college. Several studies have in fact found the proportion of students in a school enrolled in college preparatory curricula to vary systematically with the school's average SES level (Alexander and Eckland, 1975; Alwin and Otto, 1977; Hauser, Sewell and Alwin, 1976). Hence, the higher educational goals evidenced in high SES schools may be a function not only of school-wide normative climates and of the distribution of interpersonal relations but also of the greater likelihood of enrolling in a college preparatory track in such settings.

There is then potentially a third, social structural, explanation for why students in high SES schools are more likely to aspire to go to college than their similarly able and socioeconomically situated counterparts in schools drawing from lower SES populations. Although there have been several attempts to evaluate simultaneously some of these alternative propositions regarding the basis of influences traceable to average SES level (Alexander and Eckland, 1975; Alwin and Otto, 1977; Hauser, Sewell and Alwin, 1976), none of these previous studies has contrasted directly all three perspectives just reviewed. In particular, no study has evaluated the argument that school SES levels are significant simply as proxies for schools' normative climates

against the argument that they are important because of their consequences for patterns either of curriculum placement or of peer relations. The present study seeks to sort out the relative importance of these three possibilities by estimating a school-level model of educational plans which includes measures of 1) school climate; 2) characteristics of peer networks; and 3) the proportions enrolled in various curricula.

II. The Model and Some Issues in Its Assessment

Conceptually, our postulated model, summarized schematically in Figure 1, is rather straightforward. School average SES level and climate are considered as inputs to the educational process, along with school proportion male and average mental ability level -- which are included mainly as control variables. Intervening between these and school average educational goals are measures of the proportion enrolled in the college preparatory curriculum and of the average quality and character of peer associations. What is at issue, then, is, first, whether school average SES level bears significantly upon educational plans once variations in school value climate are controlled; and, second, if it does, then how much of this remaining influence is accounted for by peer relations or tracking patterns.

These, then, are our major substantive interests, and were there no further technical complications, their assessment too would be straightforward. We are interested in school average SES level as an organizational property, and it varies only between schools and not within them. This implies that only school-to-school variation in the other variables is germane to questions about the effects of school average SES on educational outputs.

Hence, at first glance, it would appear that we could simply compute school means for each of the variables portrayed and, from their intercorrelations, estimate the regression equations implied by the model.

But there are two complications; we shall discuss each in turn. Since we are interested only in school-level propositions, a school-level analysis on aggregated student characteristics would be quite suitable, even though some of our aggregated outcome measures (e.g., average educational plans) would not ordinarily be thought of conceptually as school properties. These measures correspond to the level of aggregation most relevant to the model's substantive propositions. Their use is unproblematic so long as it is clear what they do and do not signify. Unfortunately, school effects analyses have not always been as cautious in this last regard as they should (Bidwell and Kasarda, 1975), resulting in somewhat confused interpretations and exaggerated claims. Improper applications and interpretations aside, however, aggregated analysis of school-level measures is in principle quite unobjectionable and in practice quite appropriate when the issues are framed at that level.

The above complication, then, is more apparent than real. The second is more fundamental. It involves another, technical mechanism through which school average SES level might appear to exert an influence; taking this mechanism into account complicates somewhat an otherwise quite routine regression analysis.

Student enrollment patterns are substantially non-random, especially so with regard to SES because of segregation in housing patterns. In fact, without such variations in the social composition of schools' clientele, school level effects of SES differences would be undetectable. That is, except for chance fluctuations, all schools would be alike in their average student SES level.

Evidencing no school-to-school variability, such an average could not account for school-to-school variability in outputs. Hence, appreciable differences between schools in the kinds of students they serve is a necessary condition for school effects of this sort. At the same time, school level SES as a construct in the propositions discussed earlier is significant sociologically and not merely demographically. It is regarded as contributing to an ecological or organizational context, and not simply as the cumulation or summarization of individual SES levels. Thus, in evaluating such propositions, it is important to distinguish SES "context" effects from demographic or compositional effects. These latter are outcome differences that arise simply because high status students as individuals are more academically oriented and they happen to be either over- or underrepresented in particular schools. As is demonstrated in several sources (Alwin, 1976; Fennessey, 1970; Hauser, 1971), these types of effects can be distinguished by adjusting school level outcome effects for input level differences between schools. The composition is measured for these purposes by the deviation of the school average on the contextual attribute (here, SES) from the overall sample average; the adjustment itself makes use of the within-school regression coefficient of the outcome on the within-school counterpart of the contextual variable. The procedure is equivalent to a covariance adjustment, with the residual school-level effect corresponding to an adjusted treatment effect.

The technical details of this methodology are available in the sources cited and need not be presented here. What is important for our present purpose is the need to distinguish contextual from compositional influences in school SES effects, since only the former is of immediate, substantive interest. This can be accomplished in a number of mathematically equivalent

ways. We could, for example, partition our data matrix into its within and between school components, use the results from a within-school regression analysis to adjust algebraically the between-school outcomes, and then carry out a second regression analysis on these adjusted outcomes. Alternatively, we could perform the analysis using only individual-level outcome variables, but including as predictors both individual and aggregated versions of our school variables. We have -- for reasons to be discussed -- chosen to present the second. This procedure turns out to be somewhat complex to present owing to our decision not to do the composition adjustment for all independent variables (our reasoning for this is presented below); but such awkwardness is far outweighed by the opportunity this affords to demonstrate, by way of example, some of the implications and complications of this sort of analysis. Our impression is that considerable confusion regarding these matters persists among both producers and consumers of contextual research. It is hoped that the comparisons we present, using successively more appropriate modes of analysis, will help to clarify some of these matters.

With these preliminaries behind us, we can now discuss in somewhat greater detail the particulars of Figure 1.

-- Figure 1 about here --

The model includes four exogenous variables measured on each school: school average abstract reasoning score, school proportion male, school avereage SES level and school academic climate. The first three of these are aggregated from characteristics of the individual students attending the schools in our sample. Composition adjustments for their effects are done throughout, employing the counterpart individual-level measures from which these school means are computed. School climate, as measured (see below), has no within school variability, and hence no adjustment is required. As intervening variables, we include

the percentage of students enrolled in a college preparatory track and several aggregated characteristics of those students in the school who are identified by our sample respondents as their close friends. These include the average ability levels, average SES levels, and average educational plans of chosen friends. The first two of these differ from their counterpart exogenous measures in that the averages are computed only for named friends. Thus, some students are omitted entirely from these calculations and others are included numerous times, once for each time they are named by some other respondent. The intent here is to characterize the average qualities of peers named as friends. When these appear as dependent variables in one of the equations of the model, they are measured at the individual level to permit composition adjustments for school-level influences on them. When they appear in other equations as independent variables, however, we use only the aggregated measures; that is, for these variables we do not seek to distinguish their compositional from their contextual influences. Because our substantive focus is on the possible mediation of the influence of school average SES level and because both components of influence from the school-level intervening variables can serve as mediators of SES influences, there is no need to separate out their relative importance. Although doing so would provide additional detail on, for example, precisely how curriculum patterns transmit prior influences of average SES level, such refinement here would be a matter of substantive taste rather than methodological necessity. At least for preliminary analysis, it was felt that this would be excessively fine-grained, especially since we lack any sense of how important these mechanisms are overall.

Our use of aggregated peer characteristics to index interpersonal influences at the school level probably warrants brief comment, since it is the

operational counterpart of the measures versus concept distinction mentioned earlier. If we were interested in a comprehensive accounting of the relevance of peer networks for individual student outcomes, such aggregation clearly would be improper. Most formulations of the interpersonal mediation of compositional influences have been framed at the individual level (Campbell and Alexander, 1965, being the most prominent and influential example), but it is important to recognize that the consequences of school-to-school differences in average SES level apply only to school-to-school differences in peer attributes -- that is, to friends' traits averaged or aggregated across the entire student body. Within school differences in friends' characteristics (and in the other dependent variables of this analysis) are orthogonal to between school differences in these same traits and hence are irrelevant to propositions regarding the influence of school-level independent variables. This is true regardless of whether the dependent variables are measured at the individual level, as is done in cross-level contextual analysis, or are aggregated at the school-level.

We wish to emphasize that this in no way denies the importance of the within-school variability in our intervening and dependent variables, nor does it deny that other qualities of school environment and/or of educational experience, which themselves vary within schools, might be of considerable consequence for that within-school variability. Nor, for that matter, does it assert that such aggregated measures necessarily correspond to conceptually meaningful school-level variables. It is, as in the present instance, quite proper to be interested substantively in peer relations, educational plans and the like conceptually as qualities of individual students, and yet to study only the between-school component of their variability if this is appropriate in terms of the specific propositions being evaluated.[1] All of this adds up

to a somewhat complex chain of reasoning. First, our basic concepts apply to characteristics of individuals; second, our substantive propositions concern the school averages on those conceptual variables, since these averages are the indexes which appropriately measure the existence and impact of school-level influence processes; but third, our technical approach (i.e., a version of contextual analysis) requires that we employ certain variables at the individual level as well as at the school level, and that the dependent variable be used at the individual level.

For this analysis, the outcome variable of main interest is educational plans. This is conceptually a property of individual students; we are interested in accounting for its between-school variation only; but our analysis technique requires that the dependent variable in the regressions be individual scores. In our preliminary analysis, school mean plans is used as the outcome variable, but only to serve as a benchmark in demonstrating some of the methodological pitfalls in contextual research. Although many additional dependent variables have been considered in the school effects literature, the SES composition-educational plans linkage in particular has been the object of much speculation and research. That relationship is the focus of the theorizing that our model organizes and, consequently, the focus of our analysis as well.

METHOD

Sample

Our data are drawn from a survey conducted in twenty public, coeducational high schools in 1964 and 1965 (McDill and Rigsby, 1973). The schools were selected purposively to maximize variation on educational and social climates,

demographic and social characteristics, region of the country, and educational outcomes such as college plans and occupational aspirations. Detailed information on the selection of the sample and its characteristics is presented in McDill and Rigsby (1973).

Several types of data were collected in the survey: self-administered questionnaires from the students, teachers and principals of each school; information from student records such as grade-point averages in English, academic rank (available for seniors only) and absences; and scores on two standardized academic tests, one measuring aptitude for abstract reasoning and the second measuring achievement in mathematics.

The present analysis is based upon the senior classes from the eighteen schools in the twenty school sample which had a twelfth grade. These eighteen schools enrolled some 5000 seniors, of whom 3050 had information on all the items required for the present analysis. Although an N of 18 obviously is smaller than one would prefer given the complexity of our model, we nevertheless believe these particular data have certain virtues which recommend their consideration despite such misgivings. Most importantly, no other data set of which we are aware contains information of comparable quality on both normative climates and peer characteristics -- both critically important variables in the present undertaking. Moreover, the results from numerous analyses of these data generally are quite consistent with those obtained from other samplings of schools and students. Thus, conclusions from these 18 schools (and the 5000 or so seniors enrolled in them) should provide a solid, though imperfect, indication of how these patterns occur in general.

Variable Measures

School and student variables were measured, with one exception, with the same items, the school values being simply the within-school averages on the corresponding student traits. The exception is the value climate measure, which is described below.

1. Background Characteristics

   A. Father's Education: seven pre-coded response categories, ranging from "some grade school" to "attended graduate school or professional school after college," were provided for a single item in the student questionnaire.

   B. Mother's Education: this measure is identical to that for father's education.

   C. Number of Books in the Home: respondents were asked to estimate the number of volumes in their homes, with five response options ranging from 25 or fewer to more than 500.

   D. Father's Occupational Status: an item in the student questionnaire inquiring about father's current occupation, containing 17 response categories. These were collapsed to the following eight occupational categories, which correspond to the conventional census classification of occupational status developed by Edwards (1943): unskilled; semi-skilled; skilled; clerical or sales; proprietors; managers or officials; technical; and professional.

Preliminary analysis revealed that at the school-level these measures of student-body status characteristics were too highly correlated to permit their separate use (all zero-order correlations among the four were above .90).

Consequently, we decided to compute a status index as the sum of the four indicators. The composite is employed at both the school and individual levels to maintain comparability, even though collinearity was not especially severe in the latter instance.

E. Sex: measured as a dummy variable, with boys coded 1 and girls 0.

2. Academic Variables

A. Abstract Reasoning: measured using a fifteen-item, multiple choice test designed to measure the ability to determine inductively the logical relationships among patterns of diagrams (Dailey and Shaycoft, 1961:40-2). The reliability estimates obtained for the senior boys and girls, using the KR-20, are .634 and .635, respectively, which compares favorably with those reported in the Project Talent studies (Flanagan et al., 1964).

B. Curriculum: program of study is self-reported. "College preparatory" enrollment (coded 1) is contrasted against all other types of programs (coded 0).

3. Educational Plans: obtained from an item asking if the respondent intended to attend college. Four levels of plans are represented in our measure, coded from four to one: 4) yes, as a full-time student right after high school; 3) yes, but either as a part-time student or not right after high school; 2) undecided; 1) no, never.

4. School Climate

Thirty-nine aggregative characteristics of the schools, based on data from both student and teacher questionnaires, were factor analyzed in the

original work with these data, using the principal component solution and orthogonally rotated to simple structure using the Varimax method. These 39 global characteristics or variables -- all of which treat the respondent as an informant, not a respondent -- are from the following sources: Twenty-three of the variables are from student questionnaires and 16 from questionnaires administered to teachers. Twenty-seven of the 39 variables are scales adapted from the College Characteristics Index (Pace and Stern, 1958) and the High School Characteristics Index (Stern, 1963). The remaining 12 variables are single-item indicators of school climate, with ten of them drawn from student questionnaires and two from those administered to teachers.

Six interpretable factors were extracted which summarize, with a relatively high degree of precision, the information contained in the 39 variables. Estimates of factor scores were computed (Cooley and Lohnes, 1962, p. 164) for the schools on each factor, permitting the results of the factor analysis to be transformed into measures of six dimensions of school climate. Only school scores on the first factor are used in the present analysis. This dimension of school climate is an indicator of the general support for achievement and for intellectualism in the school environment. Schools with high positive factor scores on this construct can be described as having student bodies and faculties which place a premium on academic excellence. Additional detail on the procedures for measuring school climate is available in McDill and Rigsby (1973).

5. Peer Characteristics

Our model includes three different types of peer influences. These measures of "proximate" peer influences are based on sociometric data obtained directly from the friends named by the respondent. Each student was asked

to name the students of the same sex in school with whom he or she associated most often. A maximum of four friends was coded for each respondent, and relevant information on these peers was extracted for the present analysis on the first of these named friends.

Measures of friend's SES, abstract reasoning, and educational plans are used in this analysis. All are measured as described above for the respondents themselves. Thus, we have extensive, and presumably accurate (at least more so than would be expected from respondent's reports of their friend's attributes), information on the respondent's closest peer associate.

RESULTS

Since our interest focuses on the between-school variance in educational inputs and outcomes, it will be instructive first to consider whether this variation is large enough to warrant serious consideration. The proportions of individual-level variance situated between schools in these data span a considerable range, from a low of virtually zero (for differences in the sex composition of schools) to almost one-fourth of the variance (in student SES characteristics). The pattern is quite consistent with those observed in other data sets, which similarly have found between-school variability in students' SES background to be large relative to most other school differences (Alexander and Eckland, 1975; Hauser, Sewell and Alwin, 1976; Heyns, 1974). The between school variance in our major outcome, educational plans, is about thirteen percent. This figure is sufficiently large that achieving a better understanding of how school organization contributes to it could have important practical, as well as theoretical, value.

-- Table 1 about here --

Toward this end, we next review three alternative estimations of the model presented earlier. The first two are of interest primarily for what

they reveal regarding the methodology of contextual effects research. The third presents our final estimation. It is of interest both for its substantive content and for how this departs, or seems to depart, from the results in Tables 1 and 2.

Table 1 presents a school-level analysis of weighted school means (18 schools and a total of 3050 students). No compositional adjustments have been made for this analysis. Explained variance is quite substantial throughout these equations.[2] It is important to keep in mind, though, that these figures pertain to proportions of between-school variance accounted for, and not to the total variance in the dependent variable. The between school variance in outcomes represents only from five to twenty-five percent of the total variance.

Several features of Table 1 deserve comment beyond the obvious complication that seemingly large coefficients are insignificant owing to the inherent instability of estimates based on small samples. Two equations include standardized parameters greater than one (rows 3 and 6) and in three instances the results suggest a singularly important predictor which turns out to be either the student body counterpart of the friends' trait (ABS REAS and SES) or the friends' counterpart of the student body trait (PLANS). Such a pattern raises the suspicion, first, that the results are prima facie not believable (out-of-range estimations) and, second, that even if potentially believable, they may not mean what we take them to mean (is effect being related to cause or are we simply observing the high correspondence between alternative measures of the same thing?). The matrix of zero-order correlations from which these regressions are calculated serves only to reinforce this uneasiness, for in it we find values of .99 and .98 between what are supposedly independent and dependent variables.

In view of these complications, we might well be tempted to conclude that our propositions directed attention to highly collinear phenomena, whose separate dynamics are quite difficult, if not impossible, to disentangle. Such a judgment could be premature, however, since appearances can be misleading and Table 1 does not present the technically most precise analysis which adjusts for the compositional effects of the exogenous variable. To do the requisite composition adjustments through cross-level analyses, two modifications must be made in the procedures which generated Table 1: dependent variables must be measured at the individual level; and, individual-level controls must be introduced where it is necessary to distinguish contextual from compositional influences. Ordinarily, both modifications would be done simultaneously, but in order to demonstrate their separate implications, we incorporate them incrementally, first redoing the analysis with individual-level dependent variables and then adding individual-level compositional controls. These results are presented in Tables 2 and 3.

-- Table 2 about here --

Table 2 provides a particularly interesting comparison with Table 1, for the only difference between the two is the level of measurement of the dependent variables. In Table 1 these are school means; in Table 2 they are individual student scores. However, the additional variance in the individual-level data over that in the corresponding school-level dependent variables is orthogonal to the school-level independent variables throughout. This, then, is essentially random noise insofar as the relations of interest are concerned; as such, it should not fundamentally alter the analysis' implications. While this seems a quite reasonable expectation, it appears, at first glance, to be seriously flawed, for Table 2 seems to differ from Table 1 in important respects: explained variance is much reduced; standardized coefficients are smaller throughout; and, all estimates now are within "reasonable" bounds (i.e., standardized effects all are less than one).

Upon further inspection, however, we find an exception to this pattern of discrepancies across supposedly comparable analyses: the unstandardized coefficients are exactly the same! This comparison actually illustrates, quite strikingly we think, the oft-noted caution that standardized estimates are much more sensitive to structurally irrelevant properties of data than are unstandardized estimates. In this instance the variances of the dependent variables are the culprits. These, of course, are far greater when outcomes are measured on individuals rather than on schools. In terms of variance explained, the differences between Tables 1 and 2 merely indicate that a given set of school level influences will account for a greater portion of between school variance than it will total variance, since the former is but a portion, and typically but a small portion, of the latter. The equivalence of the two is easily comprehended when the figures from Table 1 are interpreted properly as indexing the percent of between-school variance accounted for. The conversion to total variances then is straightforward if one also knows how much of the total variance in outcomes is situated between schools (the first figure simply is divided by the second).

The "discrepancies" between standardized estimates similarly arise because of the shifting dependent variable variance. The formula for obtaining standardized (β) from metric (b) coefficients makes this quite apparent:

$$\beta = b \frac{\sigma_x}{\sigma_y}$$

Obviously, as σ_y gets larger, β gets smaller, despite b's being constant. Hence a given metric influence moves the dependent variable along less of its range when that range is great than when it is small. This, though, makes the influence no less potent in the first instance than the second, since the same number of dependent variable units actually is traversed.

The differences between Tables 1 and 2 thus are entirely explicable in terms of substantively irrelevant variance properties of the dependent variable. The correspondence of the metric coefficients confirms our original intuition (and illustrates an analytic truth that Blalock [1964] and others have emphasized): random variance in the outcomes should have no bearing upon the implications of our analysis. Even recognizing this general truth, however, it is difficult in a path analysis situation not to be distracted (misled?) by the appearance of differences across these two estimations, coupled with the seemingly greater interpretability of the second set of results. The implication is clear: be wary of standardized results, especially when their relativity is not germane to the issues at hand.

-- Table 3 about here --

Table 3 adds the composition adjustment for individual SES, individual ability, and individual sex effects to the analysis reported in Table 2. This is the procedurally most appropriate of our three analyses, and its results speak most immediately to our substantive questions regarding the mechanisms of school average SES contextual effects. Again, however, comparisons with the preceding analysis will be informative regarding the implications of the methodology that distinguishes the two exercises. Consider, first, the school SES effect on educational plans; this is, after all, the central issue of this entire undertaking. In Table 2 this is the single largest exogenous influence (beta equals .185), being almost twice as important as the next largest, mean ability levels (.104). The coefficient for climate (.078), one of its propositional rivals, falls short of being even half its magnitude. Additionally, when controls are introduced for curriculum patterns and various peer characteristics as intervening variables, the metric estimate of school SES's

independent influence is hardly affected at all, dropping from .084 in the reduced form to .071 in the structural specification. From Table 2, then, it appears that school SES exercises an appreciable influence on educational plans that is entirely independent of the various mechanisms that both theory and some previous research suggest should account for its importance.

Table 3, however, by distinguishing SES compositional influences from contextual ones, adds important detail to this picture, detail which markedly alters its substantive import. Looking first at the metric coefficients, we note immediately that the SES context effect (.0215) and Individual SES (.0626) effect in Table 3 sum exactly to the value for School SES in Table 2. Hence, the individual-level controls introduced in Table 3 do in fact accomplish the desired disaggregation, separating out the compositional component of school SES differences from its contextual impact. The standardized coefficients in Table 3 do not combine similarly for the same reason that the results from Tables 1 and 2 appear to differ. The SES contextual variable is standardized relative to the variability in school means, whereas the individual-level variable is standardized relative to the variability in individual student scores. In this instance, then, the different variance properties of the independent variables obscures the equivalencies across the two tables.

What, then, does Table 3 indicate about the magnitude and nature of school SES effects? With but one exception (Peer SES), the school SES influences are shown to result to a considerable degree simply from SES differences in the kinds of students attending our various schools. In fact, compositional differences account for 89% of the school SES effect on patterns of curriculum enrollment, 56% of its influence on friends' plans, and, most importantly, 74% of its consequences for educational plans! Only in the case of friends'

SES levels is the school contextual influence at all appreciable, being more than three-fourths of the overall school SES effect (the sign reversal between contextual and compositional coefficients for friends' ABS REAS scores complicates somewhat this sort of assessment for that outcome).

It would seem, then, that, in general, school SES effects in these data do not indicate the sorts of organizational processes and influences that have been proposed in the literature. In fact, when the model is properly analyzed, the contextual impact of school average SES level on educational plans actually is trivial. In this instance, then, it hardly seems to matter which, if any, school-level sociological processes are at work. Although we have covered a great deal of territory in coming to this realization, the effort was worthwhile, for it demonstrates how susceptible such analyses are to sociological self-deception. Our substantive propositions all are plausible and theoretically informed and many of the results from Tables 1 and 2 would seem to sustain at least some of them. Had we not been sensitive to the possibility, indeed the likelihood, of false positives in an exercise of this sort, we might well have stopped before doing the appropriate analysis. Our conclusions, then, no doubt would have been more interesting sociologically, but unfortunately just plain wrong.

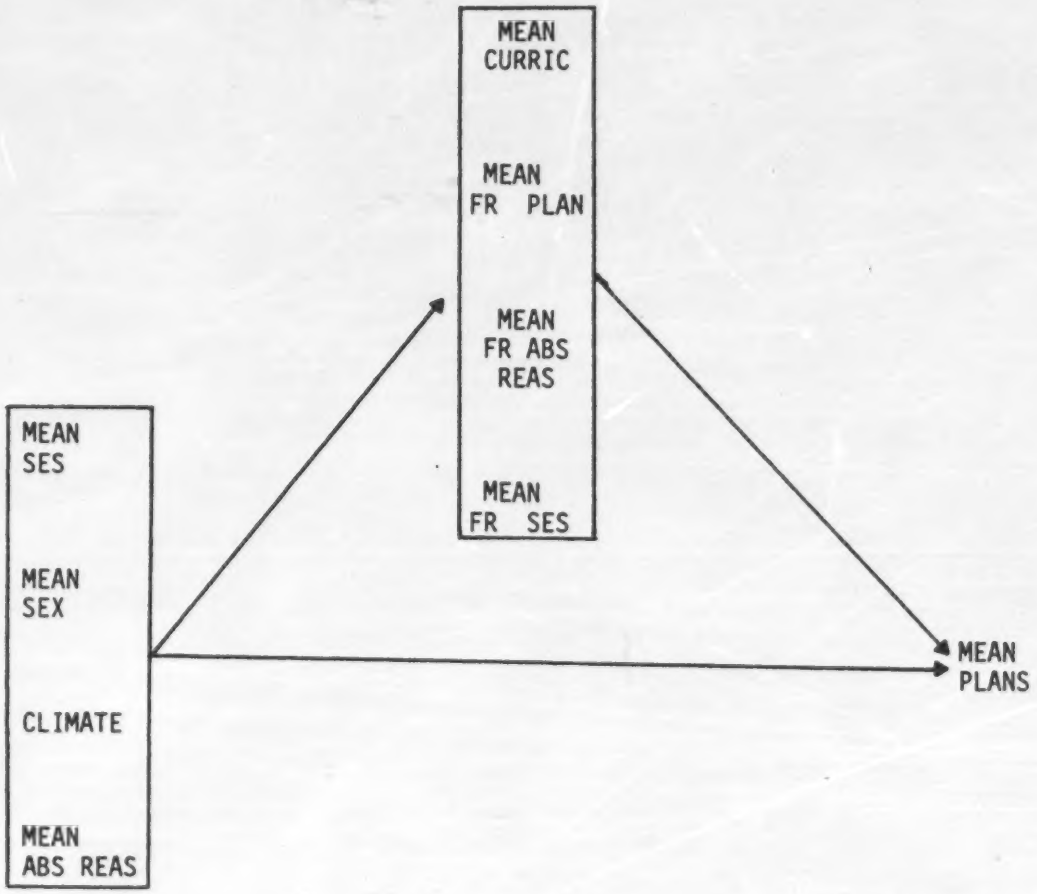
FOOTNOTES

1. Of course, any analysis of this sort is subject to a particular type of specification error in which the structural model analyzed excludes individual-level variables that, in fact, are influential. If these covary across schools with SES level, and are omitted, the estimated SES context effect will be biased. This is the major point of Hauser's critique of contextual analysis (1970).

2. When adjusted for degrees of freedom, the model's explanatory power still is considerable. For Table 1, adjusted R^2's range from .479 (for $\overline{X}$ Curric) to .983 (for $\overline{X}$ Fr. SES).

Figure 1*

Between-School Model of Aggregated Student SES Influences on Educational Plans



*For convenience of presentation, variables at a given stage of the model have been blocked. The model actually is fully recursive between blocks. Causal relations among variables within blocks are unanalyzed.

TABLE 1

School-Level Analysis of Aggregated Student SES Influences on Educational Plans

DEPENDENT VARIABLE		MEAN SEX	MEAN SES	MEAN ABS REAS	CLIMATE	MEAN CURRIC	MEAN FR PLAN	MEAN FR ABS REAS	MEAN FR SES	R^2
MEAN CURRIC	beta	.05398	.54529	-.64062	.79844					.63231
	metric	0.20290	0.02905	-0.18198	0.01100					
	t value*	0.269	1.929	2.016	3.251					
MEAN FR PLANS	beta	-.22672	.50694	.31260	.24644					.84879
	metric	-2.65198	0.08405	0.27631	0.01057					
	t value	1.759	2.796	1.534	1.565					
MEAN FR ABS REAS	beta	-.16678	-.07645	1.10305	-.06291					.90064
	metric	-2.54802	-.01655	1.27340	-.00352					
	t value	1.596	0.520	6.677	0.493					
MEAN FR SES	beta	.01051	.99208	.04068	-.05045					.98831
	metric	.73878	.98796	.21595	-.01299					
	t value	0.293	19.682	0.718	1.152					
MEAN PLANS	beta	-.13537	.51645	.28929	.21757					.80155
	metric	-1.55627	.08415	.25132	.00917					
	t value	0.917	2.486	1.239	1.206					
MEAN PLANS	beta	.09782	.43471	.08278	-.11526	.05081	1.06721	-.06743	-.49605	.99195
	metric	1.1245	.07083	.07192	-.00486	.15538	1.04890	-.05074	-.08117	
	t value	2.177	1.414	0.599	1.861	0.990	13.352	0.660	1.679	

*The t-values in Tables 1 and 2 are calculated using the case base of 18 schools, and only the between-school disturbance variance.

TABLE 2

Analysis of Aggregated Student SES Influences on Educational Plans, with Individual-Level Dependent Variables

DEPENDENT VARIABLE		MEAN SEX	MEAN SES	MEAN ABS REAS	CLIMATE	MEAN CURRIC	MEAN FR PLAN	MEAN FR ABS REAS	MEAN FR SES	R^2
CURRIC	beta	.01476	.14913	-.17521	.21837					.04730
	metric	.20290	.02905	-.18198	.01100					
	t value*	0.269	1.929	2.016	3.251					
FR PLANS	beta	-.08191	.18314	.11293	.08903					.11077
	metric	-2.65198	.08405	.27631	.01057					
	t value	1.759	2.796	1.534	1.565					
FR ABS REAS	beta	-.03672	-.01683	.24286	-.01385					.04366
	metric	-2.54802	-.01655	1.27340	-.00352					
	t value	1.596	0.520	6.677	0.493					
FR SES	beta	.00518	.48888	.02004	-.02486					.23999
	metric	.73878	.98796	.21595	-.01299					
	t value	0.293	19.682	0.718	1.152					
PLANS	beta	-.04844	.18479	.10351	.07785					.10262
	metric	-1.55627	.08415	.25132	.00917					
	t value	0.917	2.486	1.239	1.206					
PLANS	beta	.03500	.15554	.02962	-.04124	.01818	.38186	-.02413	-.17749	.12700
	metric	1.12454	.07083	.07192	-.00486	.15538	1.04890	-.05074	-.08117	
	t value	2.177	1.414	0.599	1.861	0.990	13.352	0.660	1.679	

*The t-values in Tables 1 and 2 are calculated using the case base of 18 schools, and only the between-school disturbance variance.

TABLE 3

Analysis of Aggregated Student SES Influences on Educational Plans, with Individual-Level Dependent Variables and Composition Adjustments

DEPENDENT VARIABLE		INDIV SEX	INDIV SES	INDIV ABS REAS	SCHOOL CLIMATE	MEAN SEX	MEAN SES	MEAN ABS REAS	MEAN CURRIC	MEAN FR PLAN	MEAN FR ABS REAS	MEAN FR SES	R^2
CURRIC	beta	.05421	.26889	.25820	.21837	.01101	.01659	-.22381					.19362
	metric	.05153	.02582	.05049	.01100	.15137	.00323	-.23246					
	t value*	3.304	14.124	15.233	3.248	0.200	0.203	-2.561					
FR PLAN	beta	.09531	.21000	.11516	.08903	-.08850	.07962	.09125					.17561
	metric	.21343	.04751	.05304	.01057	-2.86541	.03654	.22327					
	t value	5.746	10.910	6.719	1.565	1.897	1.149	1.233					
FR ABS REAS	beta	.06224	.11994	.09382	-.01385	-.04103	-.07596	.22520					.07152
	metric	.29867	.05815	.09261	-.00352	-2.84669	-.07470	1.18079					
	t value	3.536	5.872	5.158	1.780	1.780	2.220	6.158					
FR SES	beta	-.00402	.23042	.07872	-.02486	.00546	.37530	.00522					.29179
	metric	-.03968	.22953	.15967	-.01299	.77846	.75843	.05629					
	t value	0.263	12.916	4.956	1.152	0.306	14.292	0.185					
ED PLANS	beta	.09679	.27889	.19485	.07785	-.05513	.04732	.06683					.22800
	metric	.21506	.06260	.08906	.00917	-1.77133	.02155	.16226					
	t value	6.029	14.973	11.749	1.206	1.042	0.602	0.796					
ED PLANS	beta	.09679	.27889	.19485	-.04124	.02831	.01807	-.00706	.01818	.38186	-.02413	-.17749	.25237
	metric	.21506	.06260	.08906	-.00486	.90949	.00823	-.01714	.15538	1.04890	-.05074	-.08117	
	t value	6.123	15.205	11.931	1.860	1.758	0.166	0.141	0.990	13.352	0.661	1.679	

*In this Table, t-values for the regressors measured at the school level are based on 18 cases and only the between-school disturbance variance, but t-values for the three "INDIV" regressors are based on 3050 cases, and the total disturbance variance.

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